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Application No. : 10/625,102 Confirmation No. : 8891

Applicant : Pedro M. Buarque de Macedo

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Examiner : Michael Safavi

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DECLARATION UNDER 37 C.F.R. § 1.132

Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, PEDRO M. BUARQUE DE MACEDO, declare that:

1. I am the inventor and owner of the above-referenced U.S. Patent Application Serial No. 10/625,102 filed on July 22, 2003 in the name of Pedro M. Buarque de Macedo and entitled "PRESTRESSED, STRONG FOAM GLASS TILES."

2. I am familiar with the above-referenced patent application and the prosecution thereof before the U.S. Patent Office. I am also familiar with the Office Action dated September 11, 2006 issued therein. For the purposes of preparing this Declaration, I have reviewed the prior art references cited in the Office Action, including U.S. Patent No. 4,324,037 to Grady, II ("the Grady '037 Patent"), U.S. Patent No. 3,430,397 to Ellis ("the Ellis '397 Patent"), U.S. Patent No. 3,292,316 to Zeinetz ("the

Zeinetz '316 Patent"), U.S. Patent No. 4,450,656 to Lagendijk ("the Lagendijk '656 Patent"), U.S. Patent No. 4,124,365 to Williams et al. ("the Williams '365 Patent"), U.S. Patent No. 3,056,184 to Blaha ("the Blaha '184 Patent"), U.S. Patent No. 3,459,565 to Jones et al. ("the Jones '565 Patent"), U.S. Patent No. 3,592,619 to Elmer et al. ("the Elmer '619 Patent") and U.S. Patent No. 2,758,937 to Ford ("the Ford '937 Patent"). Based on my extensive academic and research experience as described below I am generally familiar with the field related to the above-mentioned prior art references and I believe that I am qualified as an expert in that field.

3. I received a Bachelor of Science degree in Physics from George Washington University in Washington D.C. in 1959, and received a Ph.D. in physics from The Catholic University in 1963. From 1963 to 1967, I was employed with the National Bureau of Standards, and afterwards I continue to be associated with the National Bureau of Standards as a consultant. In 1967, I joined the department of mechanics at The Catholic University of America as an associate professor. In 1970, I became a co-director of the Vitreous State Laboratory and also a professor of chemical engineering and material science at the same university. Currently, I continue to be the director of the Vitreous State Laboratory and am a professor of physics at the same university. The article in the Summer 2002 issue of the *CUA Magazine*, "Defending Against Environmental Disaster: CUA's Vitreous State Lab Has Answered the Nation's Call for 30 Years" by Richard Wilkinson, a copy of which is attached hereto as Exhibit 1, describes my contributions and achievements as a co-director of the Vitreous State Laboratory.

4. My primary area of expertise is in glass science research. In particular, I have developed technologies and products in the areas of fiber optics, defense fuels, and radioactive waste glass formulation. I have received over 43 patents in the United States and many more worldwide, and have been noted as "the area's leading individual inventor in number of patents granted" by the January/February 1990 issue of *Washington Business Journal Magazine*. For more details of my background and areas of expertise, please refer to my curriculum vita attached hereto as Exhibit 2.

5. Based on my review and understanding of all of the nine references relied upon by the Examiner (the Grady '037 Patent, the Ellis '397 Patent, the Zeinetz '316 Patent, the Lagendijk '656 Patent, the Williams '365 Patent, the Blaha '184 Patent, the Jones '565 Patent, the Elmer '619 Patent and the Ford '937 Patent) in the September 11, 2006 Office Action, I conclude that none of these references discloses or suggests, either individually or in any reasonable combination, a prestressed foam glass tile having <u>any</u> amount of prestress compression, let alone a prestressed foam glass tile having a <u>prestress compression of 4,000 psi or greater</u>, as required by all of the independent claims pending in this application, Claims 1, 23, 42 and 54.

6. By the Examiner's own admission, the first reference upon which he relies, the Grady '037 Patent, does not disclose a foam glass tile. *See* September 11, 2006 Office Action at 3. Similarly, the Examiner also acknowledges that the Ellis '397 Patent does not disclose a foam glass tile. *See id.* at 6. I agree. Based on my review and understanding of these two patents, neither the Grady '037 Patent nor the Ellis '397

Patent discloses or suggests a foam glass tile, let alone a prestressed foam glass tile having any amount of prestress compression.

7. On page 10 of the September 11, 2006 Office Action, the Examiner takes the position that "each of Lagendijk '656 and Zeinetz '316 does indeed, disclose prestressing of a foamed glass material as is set forth in the above rejection." I respectfully disagree. Based on my review and understanding of these two references, I conclude that neither reference teaches the prestressing of a foam glass tile under <u>any</u> amount of prestress compression, let alone a prestressed foam glass tile having a <u>prestress compression of 4,000 psi or greater</u> as required by all of the independent claims pending in this application, Claims 1, 23, 42 and 54, for the following reasons.

8. On page 3 of the September 11, 2006 Office Action, to support his position that the Zeinetz '316 Patent discloses prestressing of a foam glass material, the Examiner points to tension bars 36, 39 in FIG. 11 of the Zeinetz '316 Patent and asserts that these tension members hold foam glass tiles, citing Col. 4, lines 5-9 of the Patent. However, based on my review and understanding of the Zeinetz '316 Patent, FIG. 11 does not teach or even suggest the prestressing of a foam glass tile under any amount of prestress compression, contrary to the Examiner's assertion. The Zeinetz '316 Patent is directed to a roof structure, as shown in FIGS. 1 and 2 of the Patent. In conjunction with FIG. 5, the Zeinetz '316 Patent further teaches that the seam 19, 119, 21 and 121 is adapted to fit the abutting lateral edge portions of adjacent roof elements (*e.g.*, a1, a2, b2, c1, c2, and d in FIG. 5). *See* Zeinetz '316 Patent, Col. 3, lines 1-7. FIG. 11 illustrates the section of FIG. 5 along the line B--B and represents "<u>coupling means</u>" for abutting roof elements.

Id., Col. 2, lines 4-6 (emphasis added). In fact, the Zeinetz '316 Patent explicitly describes the tension bars 36 and 39 in FIG. 11 as "a locking means for use in connection with a U-shaped or tubular seam 19e, 119e, 21e and 121e." *Id.*, Col. 3, line 73 - Col. 4, line 4. In other words, the tension bars 36 and 39 in FIG. 11 are merely coupling or connecting means in conjunction with the U-shaped/tubular seam 19, 119, 21, 121 to keep adjacent roof elements together. I did not find any teaching or suggestion in the Zeinetz '316 Patent that the tension bars 36, 39 in FIG. 11 to which the Examiner points are the means for prestressing foam glass tiles, let alone providing prestress compression of 4,000 psi or greater.

9. During my review of the Zeinetz '316 Patent, I also noted that the reference teaches that the rows of interengaging profiles 19, 119, 21, 121 which keep each roof element in wedged engagement with the adjacent elements may render possible the "prestressing of the shell of the cupola." Zeinetz '316 Patent, Col. 3, lines 7-17. However, it was apparent to me that the term "prestressing" in "prestressing of the shell of the cupola" is different from the prestressing as applied to foam glass tiles to strengthen them in accordance with the present invention. For general reference providing the definition of "prestressing" as used in the context of the present invention, please refer to EDWARD G. NAWY, PRESTRESSED CONCRETE: A FUNDAMENTAL APPROACH 8-10 (1989), a copy of which is believed to have been submitted to the Examiner previously as part of the Information Disclosure Statement. To the contrary, in reading the Zeinetz '316 Patent, I understood the reference to "prestressing of the shell of the cupola" in the Zeinetz '316 Patent to be provision of a structural support to a

dome by keeping all the roofing elements together in wedged engagement, hence the title "self-supporting roof" for the Zeinetz '316 Patent. After a careful consideration of the teachings of the Zeinetz '316 Patent and based on my knowledge in the related field, I conclude that the "prestressing of the shell of the cupola" arising from wedged engagement of neighboring roof elements as suggested by the Zeinetz '316 Patent does not refer to the kind of prestressing applied to foam glass tiles as claimed in the present application. Furthermore, based on my knowledge and experience in the field, I find it hard to imagine a situation where the wedged engagement with neighboring elements as shown in the Zeinetz '316 Patent can provide a prestress compression of 4,000 psi or greater. Based on the foregoing considerations, I conclude that the Zeinetz '316 Patent does not teach or even suggest at all the prestressing of a foam glass tile under a prestress compression of any amount of prestress compression, let alone the claimed range of 4,000 psi and greater as required by all of the pending claims.

10. Moreover, the Zeinetz '316 Patent teaches a litany of roofing materials that could be used, including glass, wood, synthetic plastic, concrete, porous concrete, foamed plastic, foamed glass, cardboard, sheet metal, wool, cork and fiber board. These materials are used in a multi-layer structure where each layer is for a different purpose such as a "moisture-insulating layer" consisting of a "heat insulating layer," a "load sustaining layer" and a "sound absorbing layer." *See* Zeinetz '316 Patent, Col. 4, lines 8-15. The kind of layer that "foamed glass" may be used for is not taught. However, the load sustaining layer, which is the layer that would potentially be under compression, "is made of concrete, for example." *Id.*, Col. 4, line 14. In the Zeinetz '316 Patent, I find no

teaching that the load sustaining layer could be made of prestressed foam glass tiles as required by all the claims, let alone foam glass tiles having a prestress compression of 4,000 psi or greater as required by the rejected claims.

11. On pages 3 and 10 of the September 11, 2006 Office Action, to support his position that the Lagendijk '656 Patent discloses prestressing of a foam glass material, the Examiner points to the inner bracing cables 33, 34, the cross tie cables 36, the lower running cable 45, etc. that form the suspended roof structure in Figs. 1 and 2 of the Lagendijk '656 Patent as showing tension members holding foamed glass units in place, citing Col. 3, lines 30-60 and Col. 4, lines 34-37 as well as Fig. 6 of the Patent. I respectfully disagree. Based on my review and understanding of the Lagendijk '656 Patent, I conclude that none of the figures and text of the Lagendijk '656 Patent relied upon by the Examiner teaches or even suggests the prestressing of a foam glass tile under any amount of prestress compression, let alone a prestressed foam glass tile having a prestress compression of 4,000 psi or greater as required by all of the independent claims pending in this application, Claims 1, 23, 42 and 54, for the following reasons.

12. Like the Zeinetz '316 Patent, the Lagendijk '656 Patent is also directed to a roof structure, which, in the case of the Lagendijk '656 Patent, is composed of a wire mesh or netting with a sprayed polyurethane foam on top. *See* Lagendijk '656 Patent, Col. 4, lines 18-20. What the cited portion of Lagendijk '656 Patent suggests, at best, is the use of sprayed polyurethane foam (which is not a foam glass tile) or stiff elements of foam glass as a roof-covering material. *See* Lagendijk '656 Patent, Col. 4, lines 4-44. The

Examiner points to the inner bracing cables 33, 34, the cross tie cables 36, the lower running cable 45, etc. that form the suspended roof structure in Figs. 1 and 2 of the Lagendijk '656 Patent as showing "tension members," but I find no teaching, nor any suggestion, in the Lagendijk '656 Patent that those "tension members" contribute to prestressing of foam glass materials used as the roof covering materials under any amount of prestress compression. These alleged "tension members" form a part of a tensioned roof structure to which a fine mesh net is anchored. *See id.*, Col. 3, lines 47-54 ("This net or both nets, together with the post-tensioning of the roof structure, have been tensioned up to the final design tension, before at least a first layer of the roof covering is applied." (emphasis added)); *see also generally id.*, Col. 6, line 42 - Col. 8, line 14. The Lagendijk '656 Patent further teaches that the roof covering material is applied on this mesh net. *See id.*, Col. 4, lines 3-10. Hence, based on the foregoing description, I find it physically and technically impossible for the "tension members," the cable structure pointed by the Examiner, to provide any amount of prestress compression to the roof covering materials which are, according to the teaching of the Lagendijk '656 Patent, to stay above those "tension members" and are applied after the bars are tensioned, not before. *See* Lagendijk '656 Patent, Col. 9, lines 44-45.

13. Furthermore, Fig. 6 and Col. 9, lines 49-55 of the Lagendijk '656 Patent teach securing foam glass elements 65, which are used as part of the roof covering, to the glass-fibre mats 60, 61 by adhesive 66, thus providing an alternative means for reinforcing these foam glass materials and thereby teaching away from the prestressing as means for reinforcing these foam glass materials. By definition, this alternative

structure is again not prestressed since it is applied on top of the mesh net after the "tension members" are already in place and tensioned. I did not find any teaching or suggestion in the Lagendijk '656 Patent that the foam glass elements 65 amid the adhesive 66 shown in Fig. 6 be prestressed by any "tension members" such as the inner bracing cables 33, 34, the cross tie cables 36, the lower running cable 45, or any other component of the disclosed roof structure. Based on at least the foregoing reasons, I conclude that the Lagendijk '656 Patent does not teach or even suggest the prestressing of a foam glass tile under any amount of prestressing, let alone the prestress compression of 4,000 psi or greater.

14. Based on my review and understanding of the remaining references relied upon by the Examiner, I conclude that neither Williams '365 Patent, nor the Blaha '184 Patent, nor the Jones '565 Patent, nor the Elmer '619 Patent, nor the Ford '937 Patent teaches or suggests prestressing of a foam glass tile under any amount of prestress compression, let alone under prestress compression of 4,000 psi or greater.

15. Based on my review and understanding of all of the nine references relied upon by the Examiner (the Grady '037 Patent, the Ellis '397 Patent, the Zeinetz '316 Patent, the Lagendijk '656 Patent, the Williams '365 Patent, the Blaha '184 Patent, the Jones '565 Patent, the Elmer '619 Patent and the Ford '937 Patent) in the September 11, 2006 Office Action, I conclude that none of these references discloses or suggests, either individually or in any reasonable combination, a foam glass tile having a compression strength of 10,000 psi or greater prior to being prestressed as required by independent Claims 1 and 23 and their respective dependent claims. In particular, to support the

rejection of Claims 1, 5, 13, 14, 23, 27, 29-31 and 37, the Examiner takes the position that either the Williams '365 Patent or the Blaha '184 Patent suggests a foam glass tile having a compression strength of 10,000 psi or greater. *See* September 11, 2006 Office Action at 3. I respectfully disagree. Based on my review and understanding of the Williams '365 Patent and the Blaha '184 Patent, I came to a conclusion that neither reference teaches or suggests a foam glass tile having a compression strength within the claimed range of 10,000 psi or greater for the following reasons.

16. On page 3 of the September 11, 2006, to support his position that the Williams '365 suggests a foam glass tile having a compression strength within the claimed range of 10,000 psi and greater, the Examiner points to the following portion of the Williams '365 Patent: "Such a material should be readily available, easily formed in lengths up to 100 feet, be able to withstand a stress of <u>5,000-8,000 psi</u> . . ." Williams '365 Patent, Col. 1, lines 36-38 (emphasis added). However, this disclosed range falls short of and does not overlap at all with the claimed range of compression strength of a foam glass tile starting from 10,000 psi and higher as required by the rejected claims. Based on my knowledge and experience in the field, this difference in compression strength is substantial and the Williams '365 Patent does not explain how such substantial difference in compression strength can be overcome.

17. Moreover, Williams' '365 Patent does not even disclose "foam glass tiles," let alone "<u>prestressed</u> foam glass tiles" as required by the present claims. Indeed, the following portion of the Williams '365 Patent cited by the Examiner on page 11 of the September 11, 2006 Office Action in support of his position is the evidence: "<u>In such</u>

form, the foamed glass product can be used as a structural member in a number of industries including the housing industry as a bearing member . . . ." Williams '365 Patent, Col. 1, lines 19-22 (emphasis added). However, "such form" in the cited portion of the Williams '365 Patent refers to a "foamed glass" produced "in the form of elongate members, more particularly in the form of hollow elongate cylinders" as recited in the sentence in the Williams '365 Patent just before the cited portion. Hence, it is clear that the Williams '365 Patent is directed to an elongate structure of foam glass rather than foam glass tiles as in the present invention. In fact, the description of the preferred embodiment of the Williams '365 Patent is directed to production of foam glass in the form of hollow elongate cylinders so that it can be used as conduit such as sewer pipe, telephone pole, or power line. *See* Williams '365 Patent, Col. 1, lines 14-25 & FIG. 3. However, based on my knowledge and experience in the field, I find that, unlike in the case of foam glass tiles, prestressing of these foam glass hollow elongate cylinders to be used as conduit, telephone poles, etc. would not be desirable, nor is it technically feasible or economical. Based on at least the foregoing reasons, I came to a conclusion that the Williams '365 Patent does not teach or even suggest a foam glass tile having a compression strength within the claimed range of 10,000 psi and greater.

18. On page 3 of the September 11, 2006 Office Action, in support of his position that the Blaha '184 Patent suggests the claimed range of compression strength, the Examiner points to a portion in the Blaha '184 Patent disclosing a slab of cellular, agglomerated material having a compression strength "in excess of 1200 pounds per square inch." Blaha '184 Patent, Col. 3, lines 26-28. However, the compression strength

of 1,200 psi as disclosed by the Blaha '184 Patent falls far short of 10,000 psi, the lower end of the claimed range of compression strength required by the rejected claims. Furthermore, I do not find any teaching or suggestion of a foam glass tile having a compression strength of 10,000 psi or greater from a vague statement in the Blaha '184 Patent that the cellular material is to be "sufficiently strong to be used for structural purposes," on which the Examiner relies on page 11 of the September 11, 2006 Office Action to support his position. Blaha '184 Patent, Col. 1, lines 27-28. Even with my knowledge and experience in the field, I do not find that such a vague statement explains how a huge gap in compression strength of a foam glass tile between a mere 1,200 psi as disclosed by the Blaha '184 Patent and 10,000 psi or greater as required by the rejected claims can be technically overcome. Moreover, this statement does not teach that the resulting material can or should be prestressed. Simply put, the Blaha '184 Patent does not teach or suggest at all a foam glass tile having a compression strength within the claimed range of 10,000 psi or greater, let alone a <u>prestressed</u> foam glass tile with the claimed compression strength <u>and</u> prestress compression. Based on at least the foregoing reasons, I came to a conclusion that the Blaha '184 Patent does not teach or even suggest a foam glass tile having a compression strength within the claimed range of 10,000 psi and greater.

19. Contrary to any of the references cited by the Examiner in the September 11, 2006 Office Action, my co-pending application, U.S. Patent Application Serial No. 10/625,071, which has been incorporated by reference into the present application, actually describes the making of a foam glass tile having a previously unattainable

compression strength of 10,000 psi or greater. The properties of foam glass samples produced in accordance with the incorporated '071 Application are summarized in TABLE 1 in the present application. *See also infra* Pars. 26 & FIGS. 1-3.

20. Based on my knowledge and experience in the field, I understand the basic principle that by applying prestressing, the resulting compression strength of the prestressed product will decrease by the prestress amount while the resulting tension strength will increase by the same amount. I also understand that the optimum prestress level is defined in the field to be where a tension strength becomes comparable to a compression strength as the result of prestressing. In other words, the optimum prestress level is one half of the difference between the compression strength and the tension strength under non-prestressed condition. *See generally* EDWARD G. NAWY, PRESTRESSED CONCRETE: A FUNDAMENTAL APPROACH 8-13 (1989). Based on the foregoing, I calculated the optimum prestress level for the foam glass tiles described in TABLE 1 of the present application and found it to be approximately 44% of the compression strength of the foam glass tile prior to being in the prestressed condition. For example, for a foam glass tile having a compression strength of 10,000 psi prior to being in a prestressed condition, the corresponding optimum prestress compression is approximately 4,400 psi; for the one having a compressional strength of 12,500 psi prior to being in a prestressed condition, the corresponding optimum prestress compression is approximately 5,500 psi, etc.

21. As I concluded above, none of the references relied upon by the Examiner discloses the range of compression strength of a foam glass tile that reaches anywhere

near 10,000 psi. At best, the greatest amount of compression strength disclosed by the prior art is 8,000 psi, which is casually mentioned by the Williams '365 Patent, without any disclosure of how to go about achieving it, for an elongated tube, not a foam glass tile. For a foam glass tile having 8,000 psi, as I discussed above, the corresponding optimum prestress compression would be set at about 44% of 8,000 psi, or 3,500 psi. Based on the foregoing, I would expect that a prestress compression of 4,000 psi or greater would not be applied based on the compression strength disclosed by the prior art relied upon by the Examiner, including the Williams '365 Patent, as it would deviate from the optimum prestress level.

22. I also do not find credible the claim by the Williams '365 Patent that the elongated tube having a length of up to 100 feet and a compression strength of up to 8,000 psi should be readily available, which the Williams '365 Patent casually mentions without any support. *See* Williams '365 Patent, Col. 1, lines 14-25 and 36-38. Based on my long years of research experience and extensive knowledge in the field, such feat would be considered impossible even with today's foam glass technology, let alone in 1978, the issue date of the Williams '365 Patent. In fact, I did not find in the description of six examples in the Williams '365 Patent any indication of the success of such feat.

23. Based on my review and understanding of the Williams '365 Patent, I also find such claim by the Williams '365 Patent to be inconsistent with its later description of elongate foamed ceramic products made under the procedure it teaches. The elongate foamed ceramic product that the Williams '365 Patent teaches how to make has a cellular structure of closed, elongate bubbles with a diameter ranging from 0.01 mm to 1

cm and a length ranging from 2 mm to 5 cm. *See* Williams '365 Patent, Col. 2, lines 19-33. Based on my knowledge and experience in the field, while a small pore size by itself may not be a sufficient condition for a strong foam glass product (*see also infra* par. 25), it is a necessary condition and I doubt that a foam glass product having largest bubbles reaching 1 cm and 5 cm in diameter and length, respectively, could achieve a compression strength as high as 8,000 psi, let alone the claimed range of 10,000 psi or greater. I also note that none of the examples described by the Williams '365 Patent has an average pore size less than 1.0 mm. *See, e.g.,* Williams '365 Patent, Col. 6, lines 62-63 and Col. 8, lines 5-6. None of the examples provides any compression strength data, but based on the bubble sizes reported by the Williams '365 Patent, I doubt that any of the examples described in the Williams '365 Patent would be able to achieve a compression strength of 8,000 psi, let alone the claimed range of 10,000 psi and greater.

24. Based on my review and understanding of the Jones '565 Patent, the Elmer '619 Patent and the Ford '937 Patent, I conclude that none of these references, either individually or in combination with any other cited prior art, teaches that their disclosed pore sizes lead to a foam glass product strong enough for the purpose of prestress compression within the claimed range of independent Claims 42 and 54 and their respective dependent claims.

25. As shown in TABLE 1 of the present application and the incorporated '071 Application (*see supra* Par. 19), the present application teaches a way in which foam glass tiles having a pore size of less than 1.0 mm are strong enough to have the claimed compression strength prior to prestressing and the claimed prestress compression

required by the pending claims. However, the small pore size is a necessary but not, by itself alone, sufficient condition for the strong foam glass tiles strong enough for application of the claimed prestress compression. For example, even if its average pore size is small, the foam glass material may still have a low compression strength if the pores are dense and highly interconnected. In fact, the Jones '565 Patent discloses such a foam glass article having 18% open cells indicating a high degree of interconnectedness and a small compression strength of 129.6 psi. Jones '565 Patent, Col. 8, lines 72-75. The Elmer '619 Patent also focuses on "interconnecting pores" as the defining characteristics of its foam glass article. Jones '565 Patent, Col. 2, line 7. The Ford '937 Patent discloses a cellulated glass product having the specific gravity of 0.14 to 0.18, Ford '937 Patent, Col. 3, lines 22-24, which corresponds to a low density of 9 to 12 PCF. Such a low density cannot lead to a foam glass product strong enough for the purpose of prestress compression within the claimed range of 4,000 psi and greater. Neither the Jones '565 Patent, nor the Elmer '619 Patent, nor the Ford '937 Patent teaches or even suggests that the disclosed pore sizes lead to a foam glass product strong enough for the purpose of prestress compression of 4,000 psi or greater as required by the pending claims.

26. By way of comparison, the color photographs in FIGS. 1-3 below this paragraph show the cross sectional views of the un-prestressed foam glass tile samples made in accordance with the incorporated '071 Application. In fact, FIGS. 1-3 correspond respectively to Examples 5-7 in TABLE 1 of the present application. Once the corresponding samples were made, they were cut to take the measurements of various

properties, revealing the cross sectional views shown in FIGS. 1-3. FIG. 1 corresponds to a foam glass tile of Example 5 having an average pore size of 0.8 mm. The measured compression strength of Example 5 is 10,500 psi. Similarly, Example 6 shown in FIG. 2 has an average pore size of 0.6 mm. It achieves a compression strength of 12,500 psi. Example 7 shown in FIG. 3 has an average pore size of 0.3 mm and achieves a compression strength of 14,600 psi. All of these samples corresponding to FIGS. 1-3 are strong enough for a prestress compression within the claimed range of the pending claims (i.e., 4,000 psi or greater).

FIG. 1: Example 5 of Present Invention in TABLE 1

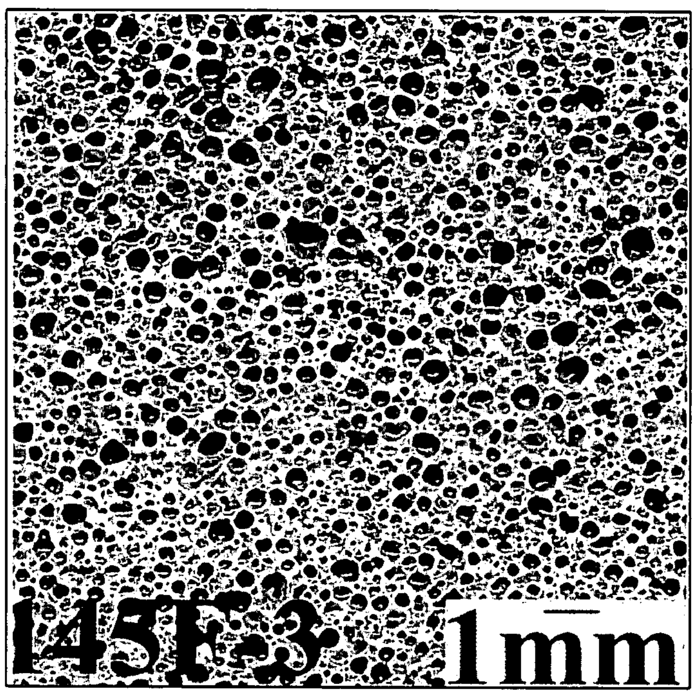


FIG. 2: Example 6 of Present Invention in TABLE 1

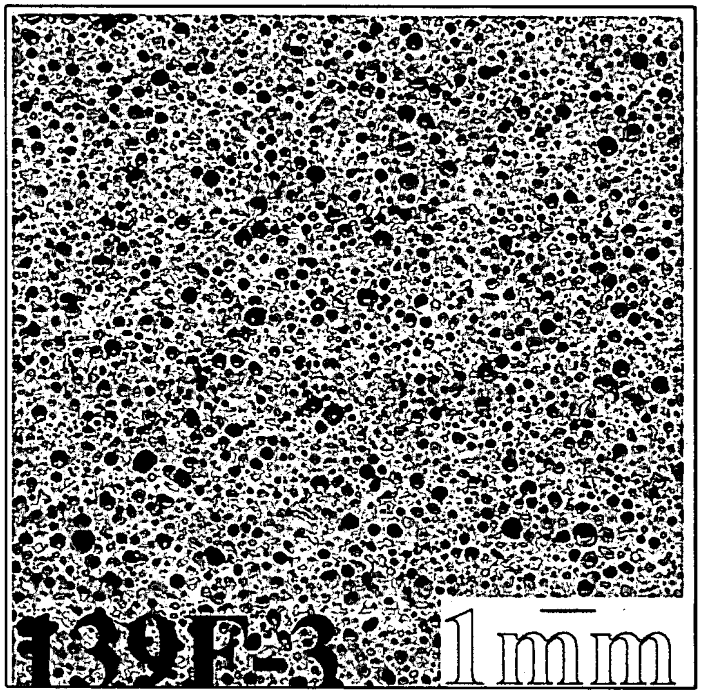
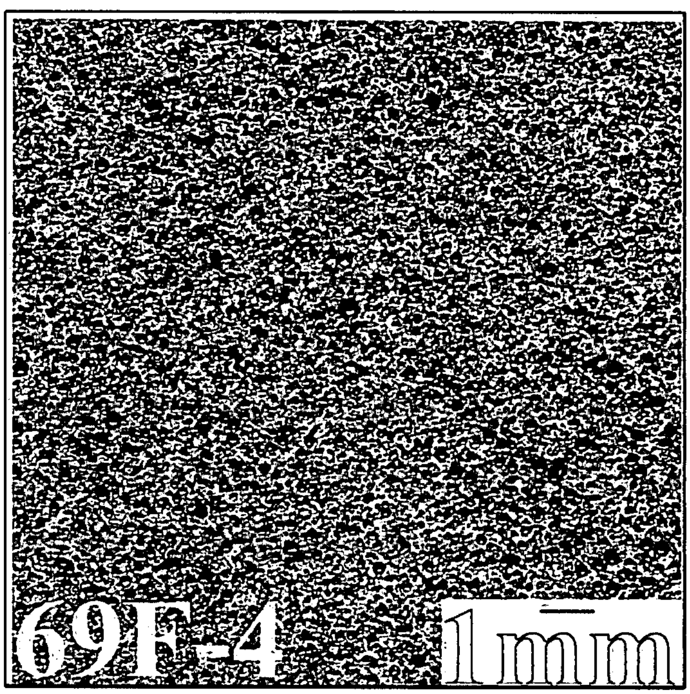


FIG. 3: Example 7 of Present Invention in TABLE 1



27. In summary, in my reading of the prior art references, at best, the Jones '565 Patent, the Elmer '619 Patent and the Ford '937 Patent merely teach that small pores can exist in foam glass materials. However, I did not find any teaching or even suggestion in any of these references that foam glass tiles made with small pore sizes in an appropriate manner can also have the compression and prestress strengths taught and claimed by in the present application.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: May 1, 2007 By: Pedro M Buarque de Macedo
Pedro M. Buarque de Macedo, Ph.D.